



**Kamlupule Wakulongosola Umo Mbuto Zalero (izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi/Mbuto izo Tunthu uto tukulongola ukhaliro wakhe tulikusinthika pakunjizga tunthu uto tukulongola ukhaliro wa mbuto zinyakhe mukati mwakhe) Zikucira pa Msika Calo Cose Capasi.**

**Wakulemba ni Clive James, uyo wakambiska kweniso ngwapampando wa Bungwe ilo lingwendeska ntchito za ISAAA**

**Cakulembeka pakupereka nchindi Na viwongo Kwa chipondi Nobel Peace Laureate, Norman Barlaug**

ISAAA Brief 41 nchakulembeka ca khumi na vinayi ca kawuniwuni, wakucitika na mlembi, wa pacaka wa calo cose capasi wakulongola umo mbuto zalero ((izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi) zikucitira pa msika kufumira apo wakaWikikira pa msika mucaka ca 1996. Mlembi wa kamlupule uyu (Brief 41) wakamulemba pakupereka nchindi na viwongo kwa chipondi Nobel Peace Laureate Norman Barlaug, awo wakaWa munthu wakwamba kovwira kweniso kwambiska nchito za ISAAA. Kamlupule uyu wakulongosola patalipatali nchito zikuluzikulu izo zacitika mucaka ca 2009. Vinandi vyakukhwaska nchito izi vikusangika pa <http://www.isaaa.org>.

Cifukwa ca kukhazikika kwa unandi wa vyakuvuna, phindu la cuma, phindu la vyacilengiwa na ukhaliro uwemi, walimi wakukwana 14 miliyoni awo wanaminda ichokoichoko na awo wanaminda yikuluyikulu mu vyalo 25 wakapanda mahekala 134 miliyoni (ma ekala 330 miliyoni) gha mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi mucaka ca 2009. Ulimi uwu ukaluta panthazi na 7% panji kuti mahekala agho ghakapandika ghakajumpho agho ghakapandika mucaka ca 2008 na mahekala 9 miliyoni (maekala 22 miliyoni). Kuyananiska kwa kukula kwa malo agho pakapandika mbuto zalero (izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi) kukaWa 8% panji kuti mahekala yakukwana 14 miliyoni ghakasazgikirapo. Mahekala ghose pamoza agho pakapandika mbuto izi (izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi) ghakakwana 180 miliyoni kuyananiska na 166 miliyoni mu caka ca 2008. Kukula kwa mahekala agho pakapandika mbuto zalero (izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi) na matayimuzi 80 pakati pa vyaka vya 1996 na 2009 kukacitika kwambula cigamulo cilicose cakulongozga pa kalutiskiro pa nthazi ka nchito izi ndipo kukula uku kukucitiska mbuto zalero (izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi) kuWa zakupokerereka mwaluWiro mwa maluso ghose gha sayansi agho ghakunghwaska mbuto mu mbiri za sono za ulimi. Ici cikulongola chigomezgo ico walimi mamiliyoni calo cose ca pasi, awo wakupanda mbuto izi caka na caka kufuma mu caka ca 1996, walinaco pa mbuto izi cifukwa ca unandi na ukulu wa phindu ilo mbuto izi zikupereka.

Unandi wa mahekala agho pakapandika mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi wukaperekeka pa mbuto zakuzirwa zose zinayi. Kwanyengo yakwamba, nchunga za soya izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zikapandika pamalo ghakujumpho vigaWa vitatu vya vigaWa vinayi vya mahekala 90 miliyoni gha nchunga za soya pa calo cose ca pasi, thonje ilo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi likapandika pa mahekala pafupifupi hafu ya mahekala 33 miliyoni agho pakapandika thonje calo cose ca pasi, ngoma izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zikapandika pa malo ghakujumpho chigaWa cimoza ca vigaWa vinayi vya mahekala 158 miliyoni agho pakapandika ngoma calo cose ca pasi ndipo nchunga izo zikucemeka canola (wakupangira mafuta ghakuphikira na vyakulya vya vifuyo) izo

ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zikapandika pa malo ghakujumpha cigaŵa cimoza ca vigaŵa vinkhondi vya mahekala 31 miliyoni agho pakapandika nchunga za canola calo cose ca pasi. Mahekala agho pakapandika mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi ghakalutirira kukula mu caka ca 2009 nanga wuli mu caka ca 2008 cipendesero ca umo mbuto izi zikapandikira cikaŵa cikulu comene muvvalo ivyo vikupanda comene mbuto izi. Mwaciyerezgero, mu calo ca India cipendesero ca umo thonje ilo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi likapandikira cikaluta panthazi kufuma pa 80% mu caka ca 2008 kufika pa 87% mu caka ca 2009 ndipo ku Canada cipendesero ca umo nchunga za canola zikapandikira cikakwera kufuma pa 87% mu caka ca 2008 kufika pa 93% mu caka ca 2009. Nchunga za soya izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zikalutirira kuŵa mbuto iyo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi iyo yikupandika comene ndipo ikapandika pa mahekala 52% ya mahekala 134 miliyoni ndipo ni mbuto iyo yikunchintha ku munkhwala uwo wukukoma thondo mu munda (62%). Pacalo cose ca pasi, kukhumbika kwa mbuto izo tunthu twakhe uto tukulongola ukhaliro wakhe tulikusinthika pakunjizga tunthu uto tukulongola ukhaliro wa mbuto zinyakhe mukati mwakhe kukukula comene ndipo mbuto izi zikutola 21% ya mbuto zose izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi ndipo mbuto izi zikufumira muvvalo 11. Vyalo vinkhondi na vitatu mwavyalo ivi ni vyalo ivyo vindakhupuke.

Mwavyalo 25 ivyo vikupanda mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi (calo ca Germany cilikuleka mu caka ca 2008 ndipo calo ca Costa Rica cilikwamba mu caka ca 2009), vyalo 16 nivyalo ivyo vindakhupuke ndipo vyalo vinkhondi na vinayi ni vyakuhupuka. Calo cili cose mwa vyaro vikhonde na vitatu ivyo vili pacanya comene cili cose cikapanda ma hekala ghakujumpha ma hekala miliyoni yimoza: USA (mahekala 64.0 miliyoni), Brazil (21.4), Argentina (21.3), India (8.4), Canada (8.2), China (3.7), Paraguay (2.2) ndipo South Africa (2.1). Mahekala 2.7 miliyoni agho ghakhalapo ghakapandika na vyalo 17 ivyo vizunulikenge apa kumalizga na vyalo ivyo vikapanda mahekala ghachoko chomene; Uruguay, Bolivia, Philippines, Australia, Burkina Faso, Spain, Mexico, Chile, Colombia, Honduras, Czech Republic, Portugal, Romania, Poland, Costa Rica, Egypt, na Slovakia.

Unandi wa mahekala agho pakupandika mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi muvyaka vya 1996 mpaka 2009 wulikufika mahekala pafupifupi biliyoni yimoza (mahekala 949.9 miliyoni panji kuti ma ekala ma biliyoni 2.3).

Cakuzirwa nchakuti, pafupifupi hafu (46%) ya mahekala pa calo cose ca pasi ghakapandika na vyaro vyambula kukhupuka, ivyo vikulindiririka kudangirira pa nchito iyi caka ca 2015 cicali cindafike. Caka ico citukuko ca calo cose ca capasi cizamufiskika (Millenium Development Goal Year), caka ico ŵanthu ŵose pa calo ca pasi ŵalikukolerana kuti ukavu na njala vicepe na hafu. Mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zambako kale kusintha vinthu kuti cakulata ici cifiskike ndipo pali cigomezgo kuti vinandi vingacitika na mbuto izi kunthazi uku.

Cakuzizika nchakuti mwaŵalimi 14 miliyoni awo ŵapindula, 90% panji kuti 13 miliyoni mbalimi awo ŵanaminda icokoicoko kweniso mbakavu, awo ŵalije vipangiri vyakukwana pa nchito ya ulimi. Ŵalimi aŵa ŵambako kale kusanga phindu na mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi ngati thonje ilo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi ndipo pali cigomezgo cakuti ŵazamupindulaso comene

na mbuto ya mpunga iyo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi iyo yambenge kuguliskika sonosono.

Kamlupule wa 2008 (2008 ISAAA Brief) akaloskera kuti nthowa zinyakhe zakulutiskira panthazi ucitiro wa mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zisangikenge ndipo ivi vikamba kucitika mu caca ca 2009. Pa 27 November 2009 calo ca China cikacita cigamulo cikulu kukhwaskana na mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi izo calo ici cikupanga. Mucigamulo ici, Calo ca China cikapeleka satifiketi yakulongola kuti mpunga na ngoma ivyo calo ici cikupanga, ivyo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi, nivyakwenerera kwa wanthu na vilengiwa wuwo. Ici cikapeleka mwaŵi kuti mbuto izo zapangika zikanjire mukawundula ndipo pajumphe vyaka viŵiri panji vitatu zicali zindayambe kuguliskika. Cigamulo ici nchakukhumbika comene cifukwa mpunga, uwo nchakulya ca wanthu wanandi pa calo capasi, ungaphindulira milyango mamiliyoni 110 (wanthu mamiliyoni 440 wangasanga cakulya pala pa mulyango uliwose pangawa wanthu wanayi) mu calo ca China pera. Muvyalo vyaku Asia milyango 250 miliyoni (wanthu biliyoni yimoza) wangaŵa na cakulya. Walimi wampunga mbamoza mwa wanthu awo mbakavu comene calo cose ca pasi, awo cakulya cawo ni mpunga uwo ukulimika pa cigawa cimoza ca vigaŵa vitatu vya hekala la mpunga. Mpunga uwo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi wungovwira kuti wavunenge vyakuvuna vinandi kweniso ukavu wawo ungacepa. Kusazgirapo apa, munkhwala wakukomera tuvidoyoyo ungaŵa wakukhumbikira viŵi yayi. Ici cingapangiska kuti malo ghakuwazingirira ghaŵe ghakwenerera malingana na kusinthatintha kwa nyengo lero. Nanga wuli mpunga nchakulya ca wanthu cakukhumbika comene, ngoma nchakulya cakukhumbika comene ca vifuyo pa calo cose ca pasi. Ngoma izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zikupangiska nkumba kulya michere inandi iyo yikucemeka kuti phosphorous (iyo yikovwira kuti viwanga na mino viŵe vyankhongono kweniso yikovwira pakupangika kwa minofu ya munthupi). Micele iyi yikucitiska kuti nkumba zikule comene kweniso yikupangiska kuti ndoŵe zakhe zileke kuŵa na micere inandi iyo yikucemeka phosphate ntheula zikuŵa zikali comene yayi kuti zingananga malo ghakuzingirira. Panyengo yasono iyo nyama yikukhumbika comene mu calo ca China, ngoma izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zingaŵa cakulya capacanya comene ca nkumba mamiliyoni 500 (hafu ya nkumba izo zili pa calo cose) izo ziri ku China kweniso zingaŵa cakulya ca nkuku ma biliyoni 13, mabakha na vifuyo/viŵeto vya gulu la viyuni ivyo vili ku China. Pali cigomezgo kuti milyango maliyoni 100 (wanthu mabiliyoni 400) ingasanga phindu na ngoma izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi mu calo ca China pera. Pakuti ngoma na mpunga nivyakukhumbika comene pa calo cose ca pasi, vyalo vyambula kukhupuka vya ku Asia na vyalo vyose vya pasi vingawonerako umo calo ca China cikucitira panchito iyi. Kudangirira kwa calo ca China pa ulimi wa mbuto za lero (izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi) kukupangiska calo ca China kuŵa calo ico vyalo vinyakhe vingawonerangako kukhwaskana na nchito iyi ndipo ici cingovwira kuti cakulya ciŵe cakukwana. Cingovwiraso kuti ulimi wambula kugomezga munkhwala wakukomera tuvidoyoyo ulutirire kweniso cingovwira kucepeska njala na ukavu. Pakuti mpunga nchakulya cakukhumbika comene kwa wanthu, na ngoma kwa vifuyo, pali cigomezgo kuti mbuto ziŵiri izi (izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi) izo zikupangika na calo ca China zingovwira comene mu vyalo vya China na Asia kweniso pa calo cose ca pasi.

Kamlupule uyu (Brief 41) waliso na cakulembeka ca padera cakukhwaska mpunga uwo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi ico mutu wakhe ni 'Biotech Rice - Present Status and Future Prospects' cakulembeka na ŵa Dr. John Bennett, awo walikupika

udindo wawu Professor (pakuwacindika), wa kusukulu yakucemeka School of Biological Sciences ya kuyunivesite iyo yikucemeka University of Sydney iyo yili mu calo ca Australia.

Cakuti tileke kuluwa nchakuti mu caka ca 2009, calo ca Brazil cikaphala calo ca Argentina ndipo cikaŵa calo caciwiri pa calo cose ca pasi ico cikupanda comene mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi. Mahekala agho pakapandika mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi mu calo ici ghakasazgikirapo na mahekala mamiliyoni 5.6. Kusazgikirapo uku nkukulu comene uko kundacitikepo mu calo ciricose pa calo cose ca capasi. Kusadzikirapo uku kukuyana na kusazgikirapo kwa 35% uko kukacitika caka cose pakati pa vyaka vya 2008 na 2009. Palije kukayika kulikose kuti calo ca Brazil ndico cikudangirira pa ulimi wakukhwaskana na mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi kweniso ni mzati wa citukuko cakunthazi. India, calo ico cikupanda comene thonje calo cose ca pasi cilikupindula comene pa vyaka 8 (2002 mpaka 2009) na thonje ilo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi. Calo ici cilikupokerera mbuto iyi kufika pa 87% mu caka ca 2009. Thonje ilo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi lalutiska panthazi kacitiro ka thonje mucalo ici. Phindu ilo walimi wathonje walikusanga pa vyaka vya 2002 mpaka 2008 ni mabiliyoni US\$5.1. Thonje ili likukhumba hafu yamankhwala ghakukomera tuvidoyoyo. Ici cili kucitiska kuti thonje liwe linandi na matayimuzi ghawiri, ico cili kucitiska calo ca India kuwa calo cikulu ico cikuguliska thonje kuvyalo vinyakhe kulekana na kugulanga ngati umo cikacitiranga pakwamba. Mabiringanyo agho ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi, agho ghakulindiririka kuwa cakulya cikulu ca calo ca India, ghali kuzomerezgeka kuluta pa msika na awo wakuwona vya malonda mu calo ca India. Ico cakhala nchakuti boma lizomerezge. Kuluta panthazi kwa ulimi uku kukawonekaso mu vyalo vyose vitatu vya mu Afilika. Mu calo ca South Africa ulimi uku ukaluta panthazi na 17% mu caka ca 2009. Ukalutaso pa nthazi muvyalo vya Burkina Faso na Egypt. Mahekala agho pakapandika thonje ilo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi ghakasazgikirapo na matayimuzi 14 kufuma pa mahekala 8,500 mucaka ca 2008 kufika pa mahekala 115, 000 mucaka ca 2009, kusazgikirapo na 1,353% uko khusazgikirapo kukulu comene pa calo cose ca pasi. Vyalo vikhondi na cimoza vyamu EU vikapanda mahekala 94,750 mucaka ca 2009, ulimi uku ukaluta pasi na 12% kuyanankasa na 9% mucaka ca 2008. Calo ca Spain cikapanda 80% ya ngoma, izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi, izo zikapandika muvyalo vyose vyamu EU ndipo palije ico cikasinda kuyanankasa na caka ca 2008 apo calo ici cikaŵa pa 22%. Mbuto ya RR® sugar beet (mbuto yasono iyo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi, iyo yikukozgana na mphatata iyo yikunong'omera comene ndipo wakupangira shuga, nacilato ca kuguliska) yikapandika comene muvyalo vya USA na Canada, yikaŵa pa 95% mucaka ca 2009, caka cacitatu kufumira apo wakayiwikira pa msika. Ici cilikupangiska mbuto iyi kuwa mbuto iyo yilikupokerereka mwaluwiro comene mwambuto zose izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi pa calo cose ca pasi.

Mucaka ca 2009 mbuto za sono izo zilikupangika pakusinthika ukhaliriro wa mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zikapandika ndipo ici kwanyengo yakwamba cikapangiska kuti vyakuvuna viwe vinandi comene. Nchunga za soya, izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi, zakucemeka RReady2Yield™ ninchunga izo nchilongolero ca kwamba ca mbuto zasono zapadera izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi izo zicali kufufuzika na wanthu



wanandi awo wakucita vitukuko vyalero. Nchunga izi zikapandika na walimi 15,000 pa mahekala ghakujumpha mamiliyoni 0.5 mu vyalo vya United States na Canada mu caka ca 2009.

Kuwunika kwasono kwa mpindu lakufuma ku mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi kwa calo cose ca pasi kukulongola kuti phindu la cuma lakukwana mabilyoni US\$51.9 likasangika kwizira munthowa ziwiri. Pakwamba, phindu ili likiza cifukwa cakuti ndalama izo zikunjira mu ulimi wa mbuto izi zilikepepe na 50%. Caciwiri nchakuti unandi wa vyakuvuna wulikuszgikirapo na 50%, sono pakuwa vyakuvuna matani mamiliyoni 167. Kuwevyenge mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi pakumbikanga mahekala mamiliyoni 62.6 ghakuszgirapo kuti pa we vyakuvuna vinandi ngati ivi. Nthewula kupanda mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi ninthowa yiwemi yakusungira malo. Nyengo yenyeyoso, 1996 mpaka 2008, kukapenekeka kuti munkhwala wakukomera tuvidoyoyo wucepenge na makilogalamu mamiliyoni 356. Ndalama zakukwana 8.4% sikasangika izo zikalindiririka kuti zigwirenge nchito pakugula munkhwala wakukomera tuvidoyoyo. Mucaka ca 2008 pera, mabilyoni 14.4kg gha muvuci wa CO2 ghakasangika kujumphira mu mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi. Unandi wa muvuci uwu ukuyana na kufumiskapo magalimoto mamiliyoni 7 pa musewu (Brooks and Barfoot, 2010, ilo likwiza).

Mucaka ca 2009, wanthu wanandi wakujumpha hafu (54% panji mabilyoni 3.6) wakakhalanga mu vyalo 25 ivyo vikapanda mahekala mamiliyoni 134 gha mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi. Unandi wa mahekala agha ukuyana na 9% ya mahekala mabilyoni 1.5 ghamalo agho pakupandika mbuto pa calo cose ca pasi.

Mpindu ilo lingasangika pakuguliska mbuto zalero (izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi) pa calo cose ca pasi likawikika pa mamiliyoni US\$10.5 mu caka ca 2009. Kweni mpindu la mbuto (izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi) ngati ngoma, nchunga za soya na thonje likawikika pa mabilyoni US\$130 mucaka ca 2008 ndipo likulindiririka kukula caka na caka na 10% mpaka 15%.

Pacanya pa vyalo 25 ivyo vikapanda mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi mu caka ca 2009 pali vyalo 32 vyakuszgirapo (pamoza pali vyalo 57) ivyo vili kuzomera kugula mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi kuti zigwiriskikenge nchito ngati cakulya ca wanthu na vifuyo kweniso kuti mbuto izi zingasangika muvyalo ivi ndipo kuzomera uku kuli kucitika kufuma mu caka ca 1996. Mucaka ca 2009 vakuzomerezga 762 vili kuperekeka pa pavyakucitika 155 vya mbuto 24 izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi. Pambuto izi paliso maluwa ghakucemeka blue rose agho ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi agho ghakupandika mucalo ca Japan.

Pali cigomezgo kuti nthowa za sono za mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zipindulenge comene pakati pa vyaka vya 2010 mpaka 2015. Mwa wi ukwenera kuperekeka kunchito zakukhwaska mbuto izi izo nizakwenerera, izo zikukhumba ndalama zinandi yayi kweniso izo zingacitika munyengo yakwenerera. Pali khumbo ilo likukulirakulira, wowwiri wa ndalama na wowwiri wa sayansi kuti nchito yakupanga mbuto izi, kuzomelezga kwa mbuto izi na kupokerereka kwakhe vilute pa nthazi. Pali cigomezgo cakuti, pacalo cose ca pasi, cipendesero ca vyalo ivyo vikupanda mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi, walimi awo wakupindula na mbuto izi,

kukula kwa malo agho mbuto izi zikupandikapo vizamukwera kutayimuza kaŵiri mucigaŵa caciŵiri, 2006 mpaka 2015, ca kupanga phindu na mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi ngati umo kamlupule wa ISAAA wacaka ca 2005 wakaloskera/wakacimira (pakufika caka ca 2015, ISAAA ikaloska kuti kuzamuŵa vyalo 40 vyakupanga na kupanda mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi, mamiliyoni 20 ghaŵalimi awo ŵakupanda mbuto izi kweniso mahekala mamiliyoni 200 agho pakupandika mbuto izi). Kusangika kwa mbuto izi kuzamulutirira kweniso zizamusangikanga chomene kuti vinthu vyakukhumbika pa moyo wa ŵanthu pacalo cose ca pasi vizakasangikenge kwambula suzgo comenecomene muvyalo ivyo vikuhupuka sono vya Asia, Latin America na Afilika. Mbuto zinyakhe izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zizamusangika mu vyaka vya 2010 mpaka 2015. Zinyakhe mwambuto izi ni ngoma izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi zakucemeka SmartStax™ izo zizamusangika ku USA na Canada mucaka ca 2010. Mbuto iyi yikupangika pakusazga tunthu tunkhondi na tutatu uto tukulongola ukhaliro wa mbuto zakupambanapambana ndipo kusazga uku kukupereka mbuto za mitundu itatu.

Mabilinganyo agho ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi ghazamusangika mu calo ca China mucaka ca 2010 pala boma la China lazomerezga. Mpunga wakucemeka Golden uwo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi uzamusangika mucalo ca Philippines mu caka ca 2012, kufuma apo wuzamusangikaso mucalo ca Bangladesh na India ndipo pawumaliro uzamusangikaso muvyalo vya Indonesia na Vietnam. Mpunga na ngoma ivyo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi vizamusangikaso mucalo ca China mukatikati mwa vyaka viŵiri panji vitatu ndipo ngoma izo zikunchintha kumuhanya zizamusangika mucalo ca USA mucaka ca 2012 ndipo mu Sub-Saharan Africa mucaka ca 2017. Mwamwaŵi tirigu uyo wakulya micide inandi yayi na tirigu uyo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi wazamusangika pala pajumpha vyaka vinkhondi panji kujumpha apo.

Cifukwa ca kuzgeŵa kwa cakulya mu caka ca 2008 (ico cikacitiska ŵanthu kucita vipolowe muvyalo ivyo vikutukuka sono vyakujumpha 30 kweniso kupoka kwa boma muvyalo viŵiri – Haiti na Madagascar), ŵanthu ŵapacalo cose capasi ŵakamanya cinthu cakofya comene cakukhwaskana na cakulya na civikiriro ca ŵanthu. Cifukwa ca ici magulu agho ghakupereka wowwiri, ŵanthu awo ŵakuwona nchito za citukuko na zasayansi muvyalo vyakupambanapambana na ŵalongozgi wa vyalo ivyo vikuhupuka sono ŵali nakhumbo likulu kuti mbuto izi zilutirire kweniso ŵakupereka wowwiri pa nchito zakupanga mbuto izi. Kuyowoya mwacisanisani, ŵanthu ŵose pa calo capasi ŵalikumanya umo nchito za ulimi zikuvikiririra moyo wa ŵanthu ntheula nchito za ulimi zilikusisimukaso. Comenecomeneso ŵalikumanya umo nchito izi zikovwirira kuti pacalo paŵe mtende. Kuyowoya mwadididi, pali nchemo na pempho likulu pacalo cose kuti ŵanthu ŵalondezgenge nthowa za mazuŵa ghose za ulimi kweniso kuti ŵalondezgenge nthowa za sayansi zakusinthira ukhaliro wa mbuto kuti vyakuvuna vilutirire kuŵa vinandi kuti ŵaŵe na cakulya cakukwana nyengo zose.

Norman Borlaug wakakwaniska nchito yakupanga tirigu kuti wababenge chomene cifukwa wakaŵa na luso, wakaŵa wakucilimika kweniso maghanoghano ghakhe ghakakhazikika pa fundo yimoza – kupanga tirigu kuti wababenge comene pa hekala limoza. Nacilato ici wakagwira nchito iyi na mtima wakhe wose ndipo wakamanyanga kuti wakufiska khumbo ili panji kutondeka pakupima unandi wa tirigu uyo wavunika pa famu (wakacita ivi wambula kufufuza dankha unandi wa tirigu uyo wangavunika pa kamalo kacoko) kweniso mucalo cose. Wakawonaso umo vyakuvuna vovwirira kuti ŵanthu ŵaŵe na mtende kweniso kovwira pa

umunthu wawo wose. Pa 11 December 1970, vyaka 40 vyajumphya ivyo wakapokera njombi iyo yikucemeka Nobel Peace Prize ndipo pakupokera njombi iyi ivyo wakayowoya wakavipa mutu wakuti 'Green Revolution, Peace and Humanity'. Cakuzirwa nchakuti ivyo Borlaug wakakhumba kufiska vyaka 40 vyajumphya ivi - kuti mbuto zibabenge comene vikuyana waka na cilato cithu muhanya wuno. Kupambana nkhwakuti lero suzgo ndikulu cifukwa tikukhumba vyakuvuna vilutirire kuwa vinandi na matayimuzi ghaŵiri ndipo vilutirire nthena wambula kugwiriska nchito vinthu vinandi pa ulimi, comenecomene maji, mafuta ghamudongo (agho ghakupangika cifukwa ca kuvundirana kwa vinthu mudongo) na michele iyo mbuto zikulya. Ici nchakukhumbika comene munyengo yasono iyo pali suzgo lakusinthasinha kwa nyengo. Nthowa yiwemi comene yakucindikira luso la pacanya na lapadera la Norman Borlaug njakuti wanthu wose pa calo capasi awo wakukhwaskika na ulimi wa mbuto zalero (izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi) wize pamoza pakulimbana nanchito iyi. Vigaŵa vyose vya boma na ivyo nivaboma yayi vyakumpoto, kumwera, kumafumiro gha dazi na kumanjiriro gha dazi vigwire nchito pamoza kuti phindu likule ilo mbuto izi zikupereka pakugwiriska nchito vinthu pacokowaka. Cilato cikulu nchakuti mbuto izi zovwire kucepeska ukavu, njala na kucepa kwa vyakulya muthupi la munthu ngati umo tikalaghizgira muvyakulata vyacitukuko ca calo cose ca pasi (Millenium Development Goals) ico cikwenera kucitika pakufika caka ca 2015, caka ico mwasoka nchaumaliro cacigaŵa caciwiri, 2006 mpaka 2015, cakupanga phindu na mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi.

Mazgu ghawumaliro nga Norman Borlaug, awo wakaponoska moyo wa wanthu biliyoni imoza kunjala kweniso awo pacalo cose ca pasi wakaŵa na khumbo likulu kweniso wakapangiska wanthu kukhorwa na mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi cifukwa ca umo zikubabira, kucepeskera ukavu, kucepeskera njala na kucepeska kucepa kwa cakulya muthupi la munthu kweniso umo zikovwirira kuti wanthu waŵe pa mtende. Borlaug wakayowoya maghanoghano ghakhe kuti " Muvyaka vyajumphya ivi tawona umo mbuto izo ukhaliro wakhe wasinthika pakugwiriska nchito maluso gha sayansi zikuperekera phindu. Sayansi iyi yikovwira walimi pacalo cose capasi kuti waŵe na vyakuvuna vinandi panyengo yeneyiyoso yikucepeska munkhwala wakuti wugwire nchito pa nchito yakukoma tuvidoyoyo kweniso yikovwira kuti vundira lileke kuluta na maji. Phindu na uwemi wa luso la sayansi lakusinthira ukhaliriro wa mbuto lawoneka, muvyaka vyajumphya ivi, muvyalo ivyo vinacipendesero cikulu ca wanthu cakujumphya hafu ya cipendesero ca wanthu pa calo cose capasi. Ico tikukhumba nkukhoma mtima kwa walongozgi awo muvyalo vyawo walimi walije mwaŵi wuliwose palwandi pa nthowa zaulimi zakale izo zikovwira viwi yayi. Nchito yakupanga mbuto kuti zibabenge comene (Green Revolution) na nthowa iyo sono ikucemeka sanyansi yakupanga mbuto pakusinha ukhaliro wakhe (plant biotechnology) vikovwira kuti cakulya ico cikukhumbika comene sono cisangikenge kweniso nyengo yeneyiyo malo ghakupwererereka kuti wana awo wazamubabika kunthazi wazakagwiriske nchito."

Vinandi pa nkhanu iyi vyaperekeka mucakulembeka cakucemeka Brief 41 ico cikulongola phindu la mbuto izo ukhaliro wakhe wuli kusinthika pakugwiriska nchito maluso gha sayansi/mbuto izo tunthu uto tukulongola ukhaliro wakhe tuli kusinthika pakunjizga tunthu uto tukulongola ukhaliro wa mbuto zinyakhe mukati mwakhe ca caka ca 2009 (Brief 41 Global Status of Commercialized Biotech/GM Crops: 2009) ico cilikulembeka na Clive James. Pala mukukhumba kumanya vinandi mulaŵiske ku <http://www.isaaa.org> panji mukhwaskane na ISAAA SEAsiaCenter/AfriCenter Pa +63-49-536-7216/+254 20 422 3618 panji mulembe kalata ya kwenda pamageshi ku [info@isaaa.org](mailto:info@isaaa.org)